IndianaMap Prospectus

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It is with great pleasure to share with you a vision for the IndianaMap – Indiana's statewide geographic information (GI) infrastructure and contribution to the National Map. Through the Indiana Geographic Information Council (IGIC), a strong foundation of coordination exists along side an unprecedented spirit of collaboration. IGIC is a representative council of over 12 different sectors that utilize GIS, including counties, cities and towns, state, federal agencies, utilities and private industry. Indiana is a leading I-Team[1] state, recipient of the 2002 ESRI[2] Special Achievement Award, a HAZUS[3] pilot area, NSGIC[4] member state, FGDC[5] cooperating partner, contains 4 NIMA[6] "133 Cities," and is one of 8 states in the NGA[7] Center for Best Practices.

The vision of the IndianaMap is presented here within the context of emergency management and homeland security. IGIC is working closely with Indiana's homeland security authority, the Counter-Terrorism and Security Council (C-TASC), to develop a strategy to implement the IndianaMap to foster the integration of GI technology in state and local government emergency operations. At this time there are four technology programs C-TASC is implementing: interoperable communications, linked criminal justice files, web-based emergency communications network, and a statewide GIS system. While all of these systems have their value with respect to homeland security, it is C-TASC's point of pride to advocate the implementation of GIS into our emergency planning and response. Indiana was the only state to identify an I-Team as a statewide priority in the President's Homeland Security Report.

In addition to homeland security, economic development and land and water resources are driving issues for statewide GIS in Indiana. For each of these driving issues, strong champions back the IndianaMap vision with full recognition of the cross-disciplinary role GIS plays to improve decision making – GIS saves lives and saves money.

The IndianaMap Vision

The IndianaMap vision embraces the role of geographic information, technologies and innovative institutional agreements to enable improved government service to citizens, and an enhanced ability for citizens to stay informed and to engage in the democratic process. To achieve this vision, IndianaMap encompasses a number of aspects:

1) integration now of the best available data, focusing on local sources, with state and federal,
2) a distribution mechanism that provides access to data and metadata (i.e., clearinghouse)(IGIC currently operates an NSDI[8] metadata catalog node through the IUPUI University Library),
3) a web portal with tiered access for decision-makers and the public with non-technical interface to viewing geospatial information,
4) planning through the I-Team process for 100% coverage of all 7 framework layers, with variable resolution (minimum 1:24:000), within 3-5 years, and
5) education and outreach on the relevancy, importance and capabilities offered by the IndianaMap.

IndianaMap will provide mutual benefit to each level of government that in turn share in its development and maintenance. IndianaMap will initiate a locally-based, distributed statewide GI program of mutual support to county emergency operation centers; facilitate local, state and federal response to human (terrorism) and natural disasters; and, establish a foundation to support field operations and public information. It will:

1) establish the interoperable framework of technologies necessary to support discovery, access, integration, and application of spatial information from the local to state level
2) research and prototype methods to integrate GI from cooperating jurisdictions in Indiana (semantic interoperability)

3) establish a policy forum to identify and address GI policy issues for government services, emergency / disaster management, and citizen democracy.

Issues and Strategy

Indiana faces similar issues to those faced by the National Map when looking toward local data sources. To fully achieve its vision, Indiana must develop processes and solutions to overcome the technical and policy issues related to data sharing, with the ultimate goal of compiling a public, seamless, computerized map statewide.

The challenges to GIS interoperability include the following:

- Multiple GIS software platforms – e.g., ESRI (ArcView, SDE, ArcIMS); AutoCAD (Map, MapGuide); GeoSQL; Genamap; MapInfo; Smallworld; Intergraph (MicroStation, FRAMME, GeoMedia).
- Multiple coordinate systems/projections – NAD27 and NAD83 State Plane – Indiana East and Indiana West, Lat/Long, UTM and user defined.
- Multiple measurement systems – D-M-S, US survey feet, International survey feet, meters.
- Multiple database schemas for GIS layers and for attribute tables.

To-date, there are few formalized agreements for sharing data or applications among county governments or with the state. Notwithstanding, there are a substantial number of local government units that have expressed a commitment to participate in an IndianaMap pilot program. As suggested below, our strategy is to lead development of the IndianaMap with such a pilot program.

Business Case

There are many important reasons to build a multi-jurisdictional statewide GIS, including:

- Public Safety Mutual Aid – The County Sheriffs, Police Departments, Fire Departments and ambulance companies all make emergency mutual aid runs into neighboring jurisdictions. It would be valuable to all of these agencies to have access to road network, address, civil boundary, parcel and aerial photography information for areas surrounding their own jurisdiction.
- Disaster Planning, Mitigation and Response – Each County has an Emergency Management Agency which plans for natural disasters and man-made emergencies. Many scenarios call for information outside of their County, such as specifying evacuation routes, following wind plumes, tracing heavier-than-air chemical spills, and locating sources of contamination in hydrography or sewers. The tornado of 20-Sep-2002 crossed thirty-two counties in Indiana providing a critical reminder of the need for responsive disaster mitigation capabilities that can support and link jurisdictions throughout the state. Disaster mitigation plans are not only required for receiving Federal Emergency Management Agency funding, they help save lives.
- Drainage Management – Public works departments, in incorporated areas, and County Surveyors have responsibility for stormwater drainage. Since watersheds cross jurisdiction boundaries, it is useful for stormwater planning and flood management to have a complete understanding of the water courses. There are instances where neglect or construction in one County has impacted flow in an upstream County.
- Water Quality – As with drainage, surface water quality impacts all jurisdictions. It is valuable for environmental managers to have access to all watershed, wetlands and water course data to locate the sources of point pollution and non-point contamination.
- Highway Planning – Metropolitan Planning Organizations plan for highways and thoroughfares in designated metropolitan areas. County Highway departments plan roads in the rest of the state. Better information about roads and development will help road funding in all the counties, and reduce traffic congestion in urban counties. Each county has a department who assigns parcel and building addresses, and it is good practice to understand the existing addresses and ranges in neighboring jurisdictions.

- Economic Development – Planning organizations, Chambers of Commerce, economic development commissions and community foundations all understand the interdependency of the metropolitan areas and therefore the need for regional planning for economic development.
- Water Service – Indianapolis Water Company has lines extending into the counties surrounding Marion County. All other counties have multiple municipal water service districts. It would be valuable to all of these providers to know development information and service territories to help them better plan services, and assist with maintenance and outage response.
- Public Health – County Health departments perform epidemiology studies of contagious diseases and perform other public health planning and remediation programs (i.e., mosquito control) which would be aided by access to the data in neighboring counties. A recent restaurant bacteria case was traced to an establishment near a county line, and infected people in both counties.
- Utility Coordination – the area is covered by numerous water and sewer districts, and multiple gas and electric service providers. It would be valuable to each of the utility companies to have information about the "foreign" infrastructure that coexists or borders their service areas. It would be useful to government agencies (for emergency response and planning) to know where all utility infrastructure is located.
- Community Studies – Universities (IUPUI, Indiana, Purdue, Butler, Indianapolis, Marian, Martin, etc.) study the demographics, social conditions, program assets, land use, tax structure, business climate, agriculture, and environment of communities in Indiana. Access to unified regional data would be useful for these studies.
- Improved Citizen-Centric Services – IndianaMap can become an important resource in helping to engage citizens in understanding and engaging in the debate for proposed issues facing our local to state governments. For instance, IndianaMap provides an opportunity for citizens to visualize the impact of proposed land use changes prior to these actions taking place.

Statewide Business/Policy Model Proposal

The benefits of the IndianaMap are clear. What is not entirely clear is how a locally-driven IndianaMap (and for that matter National Map) will be maintained. As GI technology advances, commercial off-the-shelf (COTS) and standards-based COTS (SCOTS) solutions are being developed that address many of the technical issues identified above. Issues yet to be resolved include data-sharing policies and the business model for development and on-going maintenance.

IGIC proposes the development of a funding and data policy model to be implemented and demonstrated statewide. The model will encompass a federal, state, local cost-share that would result in maximized benefit and minimized cost to all participants. Such a strategy would support the development and on-going maintenance of the IndianaMap (and our contribution to the National Map) in which state and federal partners would commit base-level support for top-tiered architecture, supplemented with voluntary, locally-driven benefits and options.

Homeland Security Pilot Proposal

eMapsIN – Emergency Management, Analysis and Planning System for Indiana

IndianaMap will be successful when it provides solutions to real problems. The approach of the Homeland Security pilot is to enable the core GI Infrastructure statewide, and apply the core to problems of the state and local community. Solutions must be fashioned to the non-GIS user and will be delivered through an IndianaMap satellite service – eMapsIN.

IGIC proposes a strategy to use data and applications and a standards-based approach for integration to bring a flexible initial operational capacity to emergency management operations statewide. This will be supplemented with added local content within selected multi-county regions, including aggregated local health data so that it is presentable on a national basis. The pilot will be applications-oriented, web-based, with secure / tiered access for county EOCs and health departments. It will be designed to

fit within current emergency management and anti-terrorism strategies, such as GIS implementation for SEMA's Incident Command System, Comprehensive Emergency Management Plan, and syndromic health surveillance. Technical issues include:

1) security
2) disaster mitigation – business recovery – continuity of government
3) preventing loss of communication
4) assuring access to and interoperation with systems in neighboring counties.

Regional Interoperability Pilot Proposal

Building an Interoperable GIS for Central Indiana

IGIC proposes a pilot project for Central Indiana that develops technical solutions to local government data interoperability issues (as discussed above). It is anticipated that by focusing on a core group of diverse counties, the stage will be set for expansion to the other metropolitan areas of the state, followed by the remaining rural counties. Metropolitan Indianapolis consists of eight counties in central Indiana: Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, and Shelby (and 35+ municipal governments).

All of these have developed GIS to some extent, but sharing data is difficult, even though there are numerous benefits to be derived by sharing data between the governmental agencies, local utility companies and the general public. For example, Marion and Hancock informally share data, as do Marion and Hamilton, Boone and Hamilton, and Allen and DeKalb. There is a project underway to collect some GIS data from the eight county governments (and others) to be used on a non-public web service for realtors. Where possible, we would want to cooperate with this project, and make data available for government, utility and public use.

Deliverable products will be the translation software and scripts, documentation of the processes for sharing data between the communities, and documentation of the data in the various agencies and communities with contact information.

The value of building an interoperable GIS for the Indianapolis metropolitan area is clear, but the effort is not known. This project will answer several questions:

- What is the effort to build interoperable translators so that data can be kept in its native format by the owner agency, but mapped to a sharable platform?
- Can data in multiple projections and coordinate systems be translated so that the geographic accuracy is maintained? What is lost? How useable will data be that is manipulated to this extent?
- What is the effort of running the data through the manipulation engines?
- How much data can be stored in its native format and accessed "on the fly"? How much data can be accessed remotely, and how much must be copied to a clearinghouse server?

As a side benefit, we will learn the effort to overcome political resistance to sharing GIS data. Additionally we will have a complete inventory of GIS activity in the region, including the feature detail, data quality (positional accuracy, geographic completeness) and an understanding of the update and maintenance procedures and timing.

Commitment

As an all volunteer organization, IGIC has achieved much success through a dedicated and diverse group of professionals and modest grant support. In partnership with state and local organizations, our suggested state/local contribution toward the development of the IndianaMap is $100,000 (preliminary estimate in matching funds, data, and in-kind services) to be adjusted upwards or downwards accordingly. Most importantly, we have the enthusiastic commitment of several local units of

government and senior level state officials (including the Director of C-TASC) supporting the IndianaMap pilot program. Verbal commitments for participation have already been established with a number of counties.

Not only does GIS have profound modeling and planning capabilities, but the potential to showcase the same with other government agencies is boundless.

[1] I-Team – "Implementation Team" national initiative spearheaded by the federal Office of Management and Budget to energize the National Spatial Data Infrastructure
[2] ESRI – Environmental Systems Research Institute
[3] HAZUS – or "Hazards US", Federal Emergency Management Agency multi-hazards loss estimation methodology pilot project with IMAGIS, Indianapolis / Marion County GIS and Hamilton County, Indiana
[4] NSGIC – National States Geographic Information Council
[5] FGDC – Federal Geographic Data Committee
[6] NIMA – "133 Cities" include: Indianapolis, Ft. Wayne, eastern Chicago metropolitan area, northern Louisville metropolitan area; National Imagery and Mapping Agency, provides timely, relevant, and accurate Geospatial Intelligence in support of national security
[7] NGA – National Governors' Association
[8] NSDI – National Spatial Data Infrastructure

To participate, contact:
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